Listing of the Claims:

This listing of claims will replace all prior versions, and listings, of claims in this application.

1. (currently amended) A communication bus suitable for use in a hazardous area of a process plant to transmit electrical signals from one process device to a second and different process device disposed within the process plant and to interrupt the transmission of electrical signals in response to the detection of a fault condition in the communication bus, the communication bus comprising:

a first end to connect to the one process device;

a second end to connect to the second and different process device;

a first transmission path between the first end and the second end that communicates electrical signals in a first direction between the first end and the second end;

a second transmission path between the first end and the second end that communicates electrical signals in a second direction between the first end and the second end; and

a safety device coupled to each of the first and second transmission paths between the first and second ends, wherein the safety device includes a first control unit to detect a fault condition associated with the communication bus, and wherein the safety device further includes a first switch unit connected to the first and second transmission paths and having a closed position allowing a flow of electrical signals along the first and second transmission paths and an open position preventing the flow of electrical signals along the first and second transmission paths, and wherein the first control unit causes the first switch unit to move to the open position to interrupt the flow of electrical signals between the first and second ends along each of the first and second transmission paths in response to detecting a fault condition in the communication bus at the first control unit.

2. (original) The communication bus of claim 1, wherein the detected fault condition associated with the communication bus includes at least one of an open circuit, an

electrical discontinuity, a cut in the communication bus, a severed communication bus, and a disconnected end of the communication bus.

3. (currently amended) The communication bus of claim 1, further including a third transmission path ~~and a fourth transmission path, wherein~~ between the first and second ends and coupled to the safety device ~~is coupled to each of the third and fourth transmission paths~~, wherein the first control unit is configured to detect the fault condition on the third transmission path and to cause the first switch unit to move to the open position to interrupt the flow of electrical signals between the first and second ends along each of the first and second transmission paths in response to detecting the fault condition on the third transmission path at the first control unit.

4. (currently amended) The communication bus of claim 3, wherein each of the first, second, and third~~, and fourth~~ transmission paths includes twisted pair cable or coaxial cable.

5. (currently amended) The communication bus of claim 3, wherein the first control unit includes a first control device coupled to the third transmission path ~~and a second control device coupled to the fourth transmission path~~, and wherein the first control device includes a first signal source that generates an electrical signal that is communicated in the first direction along the third transmission path~~, and wherein the second control device includes a second signal source that generates an electrical signal that is communicated in the second direction along the fourth transmission path~~.

6. (currently amended) The communication bus of claim 5, wherein the first control device includes a first sensor that measures an electrical characteristic associated with the third transmission path~~, and wherein the second control device includes a second sensor that measures an electrical characteristic associated with the fourth transmission path~~.

7. (currently amended) The communication bus of claim 6, wherein the measured electrical characteristic associated with ~~each of~~ the third ~~and fourth~~ transmission ~~paths includes~~ path is one of current, voltage, ~~or~~ and resistance.

8. (currently amended) The communication bus of claim 6, wherein the first control device includes a first comparator that compares the measured electrical characteristic associated with the third transmission path to a normal operational value~~, and wherein the second control device includes a second comparator that compares the measured electrical characteristic associated with the fourth transmission path to the normal operational value~~.

9. (currently amended) The communication bus of claim 8, wherein the first switch unit includes a first switch coupled to the first control device ~~and a second switch coupled to the second control device~~.

10. (canceled)

11. (currently amended) The communication bus of claim 9, wherein the first switch includes a first relay and a second relay, and ~~the second switch includes a third relay and a fourth relay,~~ wherein each of the first and second relays is coupled to the first control device~~, and wherein each of the third and fourth relays is coupled to the second control device~~.

12. (currently amended) The communication bus of claim 11, wherein the first control device energizes and de-energizes coils associated with each of the first and second relays~~, and wherein the second control device energizes and de-energizes coils~~

~~associated with each of the third and fourth relays~~ to open and close the first and second relays.

13. (canceled)

14. (currently amended) The communication bus of claim ~~13~~11, wherein each of the first~~,~~ and second~~, third, and fourth~~ relays includes contacts that are closed during normal operation.

15. (currently amended) The communication bus of claim 14, wherein the first control device opens the contacts of the first and second relays in response to a change in the measured electrical characteristic associated with the third transmission path from the normal operational value~~, and wherein the second control device opens the contacts of the third and fourth relays in response to a change in the measured electrical characteristic associated with the fourth transmission path from the normal operational value~~.

16. (currently amended) A safety device adapted for use in a hazardous area of a process plant, the safety device comprising:

a communication bus including a first end to connect to one process device and a second end to connect to a second process device, ~~and including a~~ first, second and third transmission ~~line~~ paths disposed between and communicatively connecting the first end and the second end ~~and a second transmission line~~, wherein ~~both the first and second~~ transmission ~~lines~~ paths are disposed between the one process device and the second process device disposed at different locations within the process plant and ~~at least~~ the first and second transmission ~~line is~~ paths are coupled to communicate electrical signals between the one process device and the second process device;

a first control unit coupled to the ~~second~~ third transmission ~~line~~ path to detect a fault condition on the third transmission path associated with the communication bus; and

a first switch unit coupled to the first and second transmission ~~line~~ paths between the first end and the second end and to the first control unit and having a closed position allowing a flow of electrical signals along the first and second transmission ~~line~~ paths and an open position preventing the flow of electrical signals along the first and second transmission ~~line~~ paths, wherein the first control unit causes the first switch unit to move to the open position to interrupt the flow of electrical signals along the first and second transmission ~~line~~ paths between the first end and the second end in response to detecting ~~a~~ the fault condition associated with the communication bus on the third transmission path at the first control unit.

17. (currently amended) The safety device of claim 16, wherein the first control unit includes a sensor to measure an electrical characteristic associated with the ~~second~~ third transmission ~~line~~path.

18. (currently amended) The safety device of claim 17, wherein the measured electrical characteristic associated with the ~~second~~ third transmission ~~line~~ path includes one of current, voltage, ~~or~~ and resistance.

19. (currently amended) The safety device of claim 17, wherein the first control unit includes a comparator to compare the measured electrical characteristic associated with the ~~second~~ third transmission ~~line~~ path to a normal operational value.

20. (currently amended) The safety device of claim 19, wherein the first transmission ~~line includes a first transmission signal~~ path ~~to communicate~~ communicates electrical signals in a first direction, and ~~a~~ the second transmission ~~signal~~ path ~~to communicate~~ communicates electrical signals in a second direction.

21. (currently amended) The safety device of claim 20, wherein the ~~second transmission line includes a~~ third transmission ~~signal~~ path ~~to communicate~~

communicates electrical signals in the first direction~~, and a fourth transmission signal path to communicate electrical signals in the second direction~~.

22. (currently amended) The safety device of claim 21, wherein each of the first, second, and third~~, and fourth~~ transmission ~~signal~~ paths includes one wire or two wires.

23. (currently amended) The safety device of claim 21, wherein the first control unit includes a first control device coupled to the third transmission ~~signal~~ path~~ and a second control device coupled to the fourth transmission signal path~~.

24. (currently amended) The safety device of claim 23, wherein the first switch unit includes a first switch~~,~~ and a second switch each coupled to the first control device, ~~a third switch, and a fourth switch,~~ wherein ~~each of~~ the first ~~and third switches~~ switch is coupled to the first transmission ~~signal~~ path, and wherein ~~each of~~ the second ~~and fourth switches~~ switch is coupled to the second transmission ~~signal~~ path.

25. (canceled)

26. (currently amended) The safety device of claim 25, wherein each of the first~~,~~ and second~~, third, and fourth~~ switches includes contacts that are closed during normal operation.

27. (currently amended) The safety device of claim 26, wherein the first control device operates to open the contacts of the first and second switches in response to a change in the measured electrical characteristic associated with the third transmission ~~signal~~ path from the normal operational value~~, and wherein the second control device operates to open the contacts of the third and fourth switches in response to a change in the measured electrical~~

~~characteristic associated with the fourth transmission signal path from the normal operational value~~.

28. (currently amended) The safety device of claim 16, wherein each of the ~~first and second~~ transmission ~~lines~~ paths includes a twisted pair cable or a coaxial cable.

29. (currently amended) The safety device of claim 16, wherein the first and second transmission ~~line communicates~~ paths communicate electrical signals using a communication protocol based on Ethernet, Fieldbus, HART, PROFIBUS, WORLDFIP, Device-Net, As-Interface, or CAN.

30. (currently amended) The safety device of claim 16, wherein the first control unit includes a signal source that operates to generate an electrical signal that is communicated along the ~~second~~ third transmission ~~line~~path.

31. (currently amended) A method for providing a communication bus suitable for use in a hazardous area of a process plant, the method comprising:

communicating electrical signals from a first process device to a second process device by communicating the electrical signals from a first end of the communication bus to a second end of the communication bus along a first transmission path and a second transmission path disposed between and communicatively connecting the first end and the second end of the communication bus;

communicating electrical signals along a ~~second~~ third transmission path within the communication bus;

measuring an electrical characteristic associated with the ~~second~~ third transmission path;

detecting a fault condition associated with the communication bus in response to the measured electrical characteristic associated with the ~~second~~ third transmission path; and

interrupting the flow of electrical signals along the first and second transmission ~~path~~ paths at a point between the first end and the second end of the communication bus in response to detecting a fault condition associated with the communication bus on the ~~second~~ third transmission path.

32. (original) The method of claim 31, wherein detecting the fault condition associated with the communication bus includes detecting at least one of an open circuit, an electrical discontinuity, a cut in the communication bus, a severed communication bus, and a disconnected end of the communication bus.

33. (currently amended) The method of claim 31, wherein communicating electrical signals along the first and second transmission ~~path~~ paths includes communicating electrical signals in a first direction along a first pair of transmission wires of the first transmission path and communicating electrical signals in a second direction along a second pair of transmission wires of the second transmission path, and wherein communicating electrical signals along the ~~second~~ third transmission path includes communicating electrical signals in the first direction along a third pair of transmission wires ~~and communicating electrical signals in the second direction along a fourth pair of transmission wires~~ of the third transmission path, wherein the fault condition is detected on the third pair of transmission wires.

34. (currently amended) The method of claim 31, wherein communicating electrical signals along the first and second transmission ~~path~~ paths includes communicating electrical signals in a first direction along a first transmission wire of the first transmission path and communicating electrical signals in a second direction along a second transmission wire of the second transmission path, and wherein communicating electrical signals along the ~~second~~ third transmission path includes communicating electrical signals in the first direction

along a third transmission wire ~~and communicating electrical signals in the second direction along a fourth transmission wire~~ of the third transmission path, wherein the fault condition is detected on the third transmission wire.

35. (currently amended) The method of claim 31, wherein measuring the electrical characteristic associated with the ~~second~~ third transmission path includes measuring current, voltage, or resistance.

36. (currently amended) The method of claim 31, further including comparing the measured electrical characteristic associated with the ~~second~~ third transmission path to a normal operational value.

37. (currently amended) The method of claim 36, wherein interrupting the flow of electrical signals along the first and second transmission ~~path~~ paths includes opening switch contacts coupled to the first and second transmission ~~path~~ paths in response to a change in the measured electrical characteristic associated with the ~~second~~ third transmission path from the normal operational value.

38. (previously presented) The communication bus of claim 1, further including a third transmission path and a fourth transmission path connected in a loop within the communication bus, wherein the safety device is coupled to each of the third and fourth transmission paths and wherein the control unit includes a signal source to send a generated signal through the third transmission path and receives a received signal on the fourth transmission path and detects a fault condition based on the received signal.

39. (currently amended) The communication bus of claim ~~10~~1, wherein the safety device includes an intrinsically safe housing and the first control unit and the first switch unit are disposed in the intrinsically safe housing.

40. (currently amended) The communication bus of claim ~~10~~1, wherein the safety device includes an explosion proof housing and the first control unit and the first switch unit are disposed in the explosion proof housing.

41. (new) The communication bus of claim 3, further including a fourth transmission path between the first end and the second end and coupled to the safety device, wherein the safety device comprises:

a first switch assembly coupled to each of the first, second, third and fourth transmission paths proximate the first end of the communication bus and including the first control unit and the first switch unit; and

a second switch assembly couple to each of the first, second, third and fourth transmission paths proximate the second end of the communication bus, wherein the second switch assembly includes a second control unit configured to detect a fault condition associated with the communication bus on the fourth transmission path, and a second switch unit connected to the first and second transmission paths and having a closed position allowing a flow of electrical signals along the first and second transmission paths and an open position preventing the flow of electrical signals along the first and second transmission paths, wherein the second control unit is configured to cause the second switch unit to move to the open position to interrupt the flow of electrical signals between the first and second ends along each of the first and second transmission paths in response to detecting the fault condition on the fourth transmission path at the second control unit.

42. (new) The communication bus of claim 41, wherein at least one of the first switch assembly and the second switch assembly is housed in a protective enclosure.

43. (new) The safety device of claim 21, comprising:

a fourth transmission path communicating electrical signals in the second direction, wherein the first control unit is coupled to the third transmission path proximate the first end of the communication bus and the first switch unit is coupled to the first and second transmission lines proximate the first end of the communication bus;

a second control unit coupled to the fourth transmission path proximate the second end of the communication bus to detect a fault condition on the fourth transmission path associated with the communication bus; and

a second switch unit coupled to the second control unit and to the first and second transmission paths between the first end and the second end proximate the second end, and having a closed position allowing a flow of electrical signals along the first and second transmission paths and an open position preventing the flow of electrical signals along the first and second transmission paths, wherein the second control unit causes the second switch unit to move to the open position to interrupt the flow of electrical signals along the first and second transmission paths between the first end and the second end in response to detecting a fault condition associated with the communication bus on the fourth transmission path at the second control unit.